ANS Comment: ANS does not concur. AT&T appears to be concerned about allowing room for PCS at bands above 2 GHz. This is inconsistent with the FCC proposal to place PCS at 2 GHz and maximize the use of the higher bands to accommodate the incumbent 2 GHz users.

(6/2) "AT&T also encourages the Commission to continue discussions with the National Telecommunications and Information Administration ("NTIA") for access by non-government licensees to the 1.71-1.85 GHz government band."

ANS Comment: ANS concurs and would suggest NTIA discussions be expanded to other government frequencies below 10 GHz.

(Appendices A-D) Several alternative plans are suggested.

ANS Comment: See Attachment A, Modified Plan at sections 3-6.

Excerpts from Appendix A-D

... would result in spectrum inefficiencies ... plan arbitrarily reassigns ... this reassignment is unnecessary as shown below ... plan destroys the existing junction ... assignments appear to be arbitrary and unnecessary ... better spectrum efficiency would result [with the AT&T plan] ... it [the Alcatel plan] is seriously flawed ... AT&T's plan proposal provides more orderly migration ... The proposed [AT&T] plan provides a better balance ... AT&T's plan proposal provides a better match ...

ANS Comment: Strong words with little technical justification. ANS has revised the plans to accommodate actual technical concerns. The AT&T proposal, while being complicated, has no obvious advantages when compared to the proposed frequency plans.

(Appendix E-1/2) "We support the use of common requirements for both Part 21 and Part 94 by the Commission in its establishment of coordination requirements.

ANS Comment: This is an issue most appropriately dealt with by the Part 21 and Part 94 users. ANS observes that the industry, through the TIA Bulletin 10, is facilitating a convergence of coordination requirements.

(Appendix E-1/4) "The time period proposed for reservation of growth channels is too short ... A coordination that reserves capacity for channel growth should be good for at least five years, in order to allow the investment to be justified ... Limiting the reservation period to just six months would not be sufficient to justify the long term investment of a radio route."

ANS Comment: Noted.

(Appendix E-1/6) "[Regarding Automatic Transmitter Power Control] The Rule change should allow for a 10 dB increase in radiated power."

ANS Comment: ANS concurs.

(Appendix E-1/8) "The antenna standards proposed do not reflect current capabilities for antenna directivety. The table should be updated to reflect state of the art antenna characteristics."

ANS Comment: ANS concurs.

(Appendix E-2/2) "Specific language should be incorporated into the Rule changes that allows for growth of existing systems that have already been coordinated."

ANS Comment: ANS concurs in concept. However, provision should be made for new users ready to implement systems. They should not be blocked indefinitely from using spectrum reserved for eventual expansion of existing systems.\

Although not part of this proceeding, ANS notes that on November 6, 1992, AT&T provided comments to NTIA regarding "future requirements for the use of the radio frequency spectrum in the United States and technology trends that would impact use of the radio spectrum." On page 5 of Exhibit B to that report, AT&T observed that: "Although the requirements for long distance cross country systems are rapidly being moved to the fiber network, the growth in local distribution and small cross section connections appears to offset the decrease in long haul systems. Congestion is still present in some of the bands within metropolitan areas." Note that this statement reinforces the need for low to medium density channelization for all microwave frequencies. It also points out the need to continue discussions with NTIA regarding joint use of government spectrum by nongovernment users.

Bell Atlantic Companies

(1/3) "Bell Atlantic generally supports the Commission's effort to adopt channelization plans for the upper bands to accommodate displaced wideband and narrow band systems."

ANS Comment: ANS concurs.

(2/1,3/4) "In addition, we encourage the FCC to adopt the established de facto industry standard channelization plan for the 6 GHz band, which allows for a 29.65 MHz channel separation rather than the Commission's proposal of 30 MHz .... While this [30 MHz channel separation] proposal appears reasonable, a closer look

reveals that inefficiencies are likely to occur between existing or grandfathered licensees operating under the common carrier industry standard "T-Plan" and those operating within the new channel assignments. "

ANS Comment: ANS concurs. The proposed frequency plans have been revised to reflect these comments.

(2/2) "... the FCC should state in the rules its position on grandfathering as well as on the rights afforded incumbent licensees."

ANS Comment: ANS concurs. However, this should not be necessary with the proposed frequency plan revisions.

(2/4,3/1) "The FNPRM assures incumbents that they will be allowed to expand their existing microwave systems under current channelizations plans without the need to obtain a waiver, but fails to carry such assurances into the body of the proposed [sic] rules."

ANS Comment: ANS concurs.

COMSEARCH

(1/2) "We have encouraged the commission since the initial outset of the emerging technologies proceeding to dissolve the distinctions between Private (OF) and Common Carrier (CC) for the purpose of band allocation and to initiate a rechannelization of bands above 3 GHz to support narrow band and wideband operation."

ANS Comment: ANS concurs with this encouragement. ANS would propose that this concept be extended to government and nongovernment users.

(4/2) "Narrowband users gaining access to wideband spectrum could apply for a much higher channel capacity than required and resell the excess capacity, in essence acting as a common carrier ... Without proper regulation on capacity requirements and periodic justification of unused capacity these are but two of a number of similar scenarios that will tie up needed spectrum."

ANS Comment: Noted. The users should comment on this issue.

(6/2) "We submit that the subchannelization proposed in the FNPRM can be accomplished, but within the confines of the existing [4 GHz] frequency plan."

ANS Comment: ANS concurs. That has been accomplished using the frequency plan modifications.

(9/3) "Coordinating new 4 GHz microwave systems with earth station owners is almost always a long, tedious process involving costly RFI measurements and/or field surveys to identify shielding ... Difficulties in coordinating frequency usage with earth station operators make 4 GHz a poor substitute for the 2 GHz bands. While not impossible, narrowband usage of the 4 GHz band could be difficult and costly to engineer."

ANS Comment: ANS concurs. However, as the higher bands fill, more and more pressure will be brought to bear to use any available spectrum. Due to spectrum availability issues, we may be forced to attempt further use of this band.

(10/1) "Imposing a new 30 MHz plan on a band with an established [Lower 6 GHz] 29.65 MHz plan ("T" Plan) seems arbitrary and unnecessary."

ANS Comment: ANS has resolved this issue with the attached revised frequency plan.

(10/2, 11/1) "The 30 MHz [11 GHz] plan proposed in the FNPRM has been discussed in the common carrier microwave industry for several years, and several paths have been coordinated using this plan .... However, the frequency pairings shown in the FNPRM will make this impossible. Frequency planners need the flexibility to pair frequencies in the most suitable manner for a given system."

ANS Comment: ANS concurs. It has resolved this problem. See Attachment A, Modified Plan at Section 3-5.

(11/2) "... allow the continuation of existing frequency plans where necessary. In addition, language needs to be adopted that would allow for unpaired frequency use."

ANS Comment: ANS concurs. See Attachment A, Modified Plan at Section 3-5.

(11/3) "The omnidirectional nature of a DTS system makes it difficult to share spectrum efficiently with a point to point system. We propose to change the rules to require prior coordination and licensing of DTS end user locations."

ANS Comment: ANS concurs.

(13/2) "Therefore, this requirement [prior coordination notice] should be a logical extension to the opening of the private 6 GHz band to common carrier users."

ANS Comment: ANS concurs.

(17/3,18/1) "The reservation of growth channels is a necessity in the common carrier microwave industry. ... Without some allowance made for growth, the economic incentive to build many of these systems would disappear."

ANS Comment: Noted.

(20/1) " ... the standards for category A antennas should be updated ... (See Table 4) ... "

ANS Comment: ANS concurs.

(22/2,FN/14) "We endorse the technical guidelines developed by the National Spectrum Managers Associate [sic] (NSMA) for the successful deployment of ATPC [Automatic Transmit Power Control] systems in both the private and common carrier bands .... The commissions proposal in paragraph 33 to limit EIRP changes in Part 94 to 3 dB severely limits the advantages gained by the use of ATPC. Nominal transmit powers employed are typically 6 dB to 15 dB below the maximum authorized power."

ANS Comment: ANS concurs.

EMI Communications Corporation

(2/6) "EMI suggests that analog and digital standards be maintained and developed in tandem until the need no longer exists."

ANS Comment: ANS concurs.

(3/6) "If the commission imposes a limitation of protecting growth frequencies, it is likely that the common carrier microwave industry that serves public interest could cease to exist through lack of investment dollars."

ANS Comment: Noted. This issues should be resolved by users' comments.

(4/1) "The proposed Common Carrier 6 GHz channel plan is flawed. It was brought to the attention of Alcatel ... that there is a short coming in the proposed carrier frequency assignments...."

ANS Comment: These concerns have been resolved in the revised frequency plans.

(5/7) "To minimize this potential [spectral waste] situation, EMI proposes that in the 6 GHz and 11 GHz common carrier bands the signals that occupy less bandwidth than the presently operating channel plans be directed to the "guard bands" at the upper, lower and center of the current bands."

ANS Comment: ANS does not concur. The purpose of this rule making is to increase the utility of the bands above 2 GHz for the lower density 2 GHz band users, not to relegate those users to insignificant portions of the bands.

(6/1) "Regarding the 6 GHz private band, we see no reason why the formal Prior Coordination Notice process should not apply."

ANS Comment: ANS concurs. This is currently being incorporated in the latest version of TIA Bulletin 10.

GE American Communications, Inc.

(i/1) "If adopted, the rechannelization proposal would reduce the guardbands between microwave and satellite frequencies. In so doing, rechannelization of the C-band frequencies would adversely affect the operation of well over a dozen C-band satellites now in orbit and their successors, which are now being constructed and launched, thereby jeopardizing the billions of dollars satellite operators and customers have invested in these satellites to bring high-quality reception of video and other programming, via tens of thousands of licensed antennas, to over 50 million households. It will also impair the operations of additional millions of unlicensed backyard C-band antennas being used to deliver video signals to homes in remote locations not passed by cable."

ANS Comment: These concerns have been addressed in the revised frequency plans. See Attachment A, Modified Plan at Section 3.1.

(ii/3) "Adoption of the rechannelization plan would be premature as well as unwise. It is not certain what degree of offset between satellite frequencies and those used by terrestrial services is necessary to protect digitized and compressed television from degradation. The Commission should not adopt any rechannelization proposals without considering the nature of the degradation effects of terrestrial microwave into digital compressed video carriers, the technology necessary to mitigate this interference, and the responsibility for developing and installing this technology."

ANS Comment: ANS does not concur. GE evokes the spectre of a potentially nonexistent problem.

GTE Service Corporation

(iii/1) "GTE cannot support the proposed 4 GHz channelization plan. One early-filed set of Comments labeled it a "blueprint for disaster." GTE can only support the 4 GHz Common Carrier band for this reallocation if the current channelization is maintained, and even then, believes this band should not be a first choice option."

ANS Comment: ANS does not concur. The shrill "blueprint for disaster" comment is typical of the knee-jerk reaction the satellite users have used to respond to all attempts to reuse the 4 GHz band. Such hysteria does not foster a technical discussion of the pros and cons of various approaches. Rather than offer suggestions, we just hear more of the "not in my neighborhood" comments by the satellite users. The FCC has made it clear that the 4 GHz band is available for accommodating the displaced 2 GHz users. The question is not if it should be reallocated but how to maximize the benefits of such a reallocation.

(iii/2) "With respect to other higher frequency bands, the Commission should ensure that established frequency plans are grandfathered to allow current systems to grow normally. Narrowband systems should first be located in the upper portion of the 6 GHz band. Coordination procedure and interference criteria should be harmonized between common carrier and private use over the long haul. The Commission should plan for this convergence now. Now is also the appropriate time to require upgraded antenna specifications."

ANS Comment: ANS concurs with most of this. However, ANS does not concur with limiting use of the 6 GHz bands. Effectively lower and upper 6 GHZ are the last bands left for long distance paths (i.e., below 10 GHz). Use of these bands should not be made more difficult.

(iii/3) " GTE supports the FCC's and NTIA's efforts to allow commercial use of the Government bands and hopes the FCC is able to reflect such agreements in the final Rules."

ANS Comment: ANS concurs.

(4/FN5) "As noted by GTE in its RM-8004 Reply Comments at page 2, footnote 4: 'In its Comments, COMSEARCH noted over 40,000 frequencies in the 4 GHz Common Carrier Band have been licensed, applied for, or proposed,' which is significantly higher than the 6 GHz or 11 GHz Common Carrier bands."

ANS Comment: This may be true, but they must be satellite paths. As noted in ANS' previous comments based on COMSEARCH data over approximately the last two years, almost no fixed point to point microwave paths have been coordinated in the 4 GHz band. The band has outstanding propagation characteristics for fixed

point to point microwave paths. This highlights the difficulty of establishing 4 GHz fixed point to point microwave paths with the existing satellite users present.

(5/3) "... the proposed 6 GHz plan offers a 30 MHz bandwidth compared to today's 29.65 MHz. Since a 4:1 ratio exists between private carrier analog and digital systems in congested areas, the creation of frequency offsets (220 kHz to 2.2 MHz) will impact these analog systems as a result of carrier beat interference potentials."

ANS Comment: This concern has been overcome in the accompanying revised frequency plan. See Attachment A, Modified Plan at Section 3.2.

(9/2) "The Commission proposes to amend the Rules to explicitly authorize the use of Automatic Transmitter Power Control ("ATPC") systems under both Parts 21 and 94, but does not impose sufficient restrictions on their operation."

ANS Comment: ANS suggests that the users should define the appropriate restrictions. That is currently been done by NSMA and TIA. FCC action is neither appropriate nor needed.

(10/1) "... it is necessary for the Commission to limit the difference between coordinated and licensed power for ATPC systems and to impose restrictions on the percentage of time that such systems are permitted to operate above the coordinated power."

ANS Comment: ANS suggests that the users should define the appropriate restrictions. That is currently done by NSMA and TIA. FCC action is neither appropriate nor needed.

(10/2) "... GTE believes that this is an opportune time to upgrade the terrestrial antenna performance standards to reflect current state-of-the-art technology."

ANS Comment: ANS concurs.

(11/1) "Antenna standards reflected in Section 21.108(c) and proposed Section 94.75(b) should be specified as a single new standard. By both adopting a single standard and improving the standard by specifying a more stringent performance level, the Commission will ensure that available frequency allocations are maximized when higher performance standards are implemented. Antennas in existing systems in these bands should be upgraded to the new standard only if the use of these older antennas results in harmful interference or prevents the implementation of a new service."

ANS Comment: ANS concurs.

Home Box Office

(i/2, ii/1) "The rechannelization proposal, however, will create a totally different frequency use environment and will have very disruptive and costly consequences for existing users of the C-Band, especially the users in the video distribution industry."

ANS Comment: ANS appreciates the clear technical concerns expressed by Home Box Office. This sincere attempt to communicate the technical issues have helped ANS address the satellite users' concerns. A revised 4 GHz frequency plan is offered for satellite user review. See Attachment A, Modified Plan at Section 3.1.

(ii/3, iii/1) "With respect to the entire C-Band, if the present frequency plan is not maintained and made applicable to the microwave services which relocate pursuant to the Commission's proposal, an inequitable number of them may relocate to the C-Band, placing a larger burden on current C-Band users to coordinate and adjust to the relocation. Maintaining the current frequency plan would permit the high capacity 2 GHz users to relocate in the C-Band and spread the burden of coordinating with the relocated microwave services more equitably."

ANS Comment: ANS notes that the purpose of this rulemaking is to facilitate the movement of 2 GHz users to the higher frequency bands. The FCC made it clear that 4 GHz was one of the bands available for use by the low density 2 GHz users. The question is how can this be best accomplished, not if it should be done.

(iii/3) "... HBO requests that the Commission not adopt its proposed rechannelization plan. Instead, the Commission should permit any displaced 2 GHz microwave users to share C-Band spectrum only under the frequency plan currently in use and should restrict such relocation by 2 GHz users to those users which require at least 20 MHz channel capacity."

ANS Comment: ANS does not concur. This does not meet the intent of the rule making. Moreover, these concerns are moot because of ANS' proposal revisions to the 4 GHz reallocation and channelization set within the FNPRM. See Attachment A, Modified Plan at Section 3.1.

Hughes Communications Galaxy, Inc.

(2/4) "HCG previously has expressed concern that rechannelizing the 4 GHz band would unduly disrupt the coordination procedures that have allowed satellite users and terrestrial microwave users to co-exist for the last two decades, and would lead to increased interference into earth stations."

(3/4) "The primary reason for the peaceful co-existence of both terrestrial and satellite use of the 4 GHz band is that the 4 GHz band is broken down into 20 MHz "wideband" channels."

(4/1) "Coordination of terrestrial channels and satellite channels is accomplished by interweaving the channels in such a way that their center frequencies (where most of the energy is centered in an analog signal) are spaced as far apart as possible, by ± 10 MHz. This allows satellite receivers to screen out the edges of the transponder where terrestrial interference may be present."

(5/3, 6/1) "These problems are exacerbated when the spectrum is broken down into even smaller channels of 400 kHz to 5 MHz, as the Commission has proposed doing for the upper and lower 40 MHz of the C band (i.e., 3700-3740 MHz and 4160-4200 MHz). Those spectrum blocks include channels that essentially would be co-frequency with the center frequencies used on four of the twenty-four transponders on a C band satellite."

ANS Comment: These concerns have been addressed. A revised frequency plan is offered for Hughes' review. See Attachment A, Modified Plan at Section 3.1.

Harris Corporation-Farinon Division, Digital Microwave Corporation, and Telesciences, Inc.

(i/1) "Harris Corporation - Farinon Division, Digital Microwave Corporation and Telesciences, Inc. (together, the "Joint Commenters"), comprising the top three American manufacturers of microwave equipment in the United States, have carefully studied the Commission's Notice of Proposed Rulemaking in the proceeding and concur with many of the proposals contained therein."

ANS Comment: Noted.

(3/3, 4/1) "The Joint Commenters, as major American microwave manufacturers,[1] have carefully studied the Commission's proposal and concur with the proposals regarding minimum path length requirements, antenna characteristics, power limitations, emission and bandwidth limitations, and frequency diversity transmissions. The Joint Commenters understand that the Telecommunications Industry Association's Fixed Point-to-Point Communications Section is filing comments proposing modifications of the Commission's proposal consistent with those proposed herein. Accordingly, these modifications represent an industry consensus, and if adopted, will not only maximize spectrum utilization and the orderly migration of displaced 2 GHz band users, but also will minimize the adverse impact to new and existing licensees, while maintaining industry competitiveness."

ANS Comment: The TIA comments represent a majority of fixed point-to-point microwave manufacturers. That does not represent an industry consensus - it does not even represent a consensus of microwave manufacturers - only the

opinion of a majority. Typically TIA comments are based on consensus reached within the manufacturing industry. The TIA comments do not represent a consensus - merely the unsubstantiated opinion of a majority of the TIA members. ANS is a member of TIA and has significant reservations regarding the long term viability of the TIA position. That position was noted on the cover page of the TIA comments. Our technical reasons are outlined in a companion paper.

(5/2) "The Channelization Plans Should Be Based on 1.25 MHz Channels ... Since the vast majority of U.S. microwave manufacturers do not produce equipment compatible with 1.6 MHz-based channels, the proposed channelization plans have the effect, albeit unintended, of giving a competitive advantage to one manufacturer. ... "

ANS Comment: **This allegation is untrue.** ANS challenges the Joint Commenters to prove this allegation. They can not. To the contrary, ANS shows in Attachment C that these microwave manufacturers in fact do produce equipment that is compatible with 1.6 MHz-based channels.

(5/3, 6/1) "There are other important reasons why a 1.25 MHz-based channel plan is preferable. First, 1.25 MHz-based channels would correspond to the bandwidths employed in the 10 GHz channelization plan (e.g., 1.25, 2.5, 3.75, and 5 MHz). The 10 GHz channelization plan is a good current example of a narrowband channelization plan above 2 GHz which has been successful in meeting the needs of microwave users. Second, since the number of megahertz in standard bandwidth channels (i.e., 5, 10, 15, and 30 MHz) are multiples of 1.25, 1.25 MHz-based channels would allow easy expansion of narrowband channel capacity to larger bandwidth channels. Thus, 1.25 MHz-based channels are preferable to 1.6 MHz-based channels in that they are more spectrum efficient and allow greater spectrum utilization when systems are expanded. Under a 1.6 MHz-based channelization plan, a system that expands to greater bandwidth channels would waste spectrum by leaving large spectrum remnants."

ANS Comment: These comments do not stand analysis. See Attachment A, Modified Plan at Section 4.

(7/1) "The amount of spectrum which 1.6 MHz channels would waste is not merely hypothetical. For example, more than 70 percent of the 2 GHz common carrier digital microwave systems licensed in 1991 have been assigned 3.5 MHz bandwidth channels. To the extent these systems are relocated to the 6 GHz band and need comparable bandwidths under a 1.6 MHz-based plan, they would be forced to use three 1.6 MHz channels. Yet another reason for preferring 1.25 MHz-based channels over 1.6 MHz channels is the fact that there is little common carrier demand for 1.6 MHz channels."

ANS Comment: These comments do not stand analysis. Actually the opposite of the above claims is true. See Attachment A, Modified Plan at Section 4.

(7/2, 8/1) "While the Joint Commenters agree with the flexibility the Commission proposes to build into the channelization plan for the 5.925-6.425 GHz ("lower 6 GHz") band, particularly in terms of creating a number of narrowband channel options, the Joint Commenters nevertheless recommend that the channelization plan for that band be further revised. That plan should be revised first to reflect the proposed 1.25 MHz-based channelization approach discussed above and secondly to accommodate more adequately the expected requirements of 2 GHz migrants as well as future microwave users. Accordingly, the Joint Commenters propose that the Commission adopt a revised channel plan for the lower 6 GHz band which includes a number of 1.25, 2.5, and 3.75 MHz channels, instead of the .4, .8 and 1.6 MHz channels the Commission has proposed, and create several 15 MHz channels while maintaining the 10 and 30 MHz channels the Commission has proposed. The recommended 15 MHz channels would provide another channel option between the 10 and 30 MHz bands, and thus avoid the need for channel concatenations, and provide for the use of high capacity systems without having to resort to possible inefficient use of 30 MHz channels."

ANS Comment: These comments do not stand analysis. See Attachment A, Modified Plan at Section 4.

(8/2) "The 400 and 800 kHz channels would be eliminated partly as a result of the recommended switch to 1.25 MHz channelization approach. Moreover, microwave systems employing 400 or 800 kHz channels would not be practical from an economic standpoint. Existing microwave licensees of 800 MHz channels in the private 2 GHz bands who employ analog systems will most likely use current generation digital equipment as they migrate into the higher bands, and that equipment is currently designed around a 1.25 MHz-based plan. Even if these users do not upgrade to digital equipment, their 800 kHz systems can be accommodate in 1.25 MHz channels."

ANS Comment: ANS does not concur. See Attachment A, Modified Plan at Section 4.

(8/3, 9/1) "The Joint Commenters believe that the Commission should provide a substantial number of 40 MHz channels to accommodate the needs for very high capacity systems, primarily in the common carrier industry, including growing requirements of the cellular industry for such high capacity purposes as backhauling traffic to major switching centers. Because the 3.7-4.2 GHz band is used extensively for satellite operations, it is not expected to accommodate displaced 2 GHz users for narrowband operations. Moreover, narrowband channels in this band would not be practical or economical with 40 MHz separations between transmit and receive frequencies, which is the current industry practice in that band. Therefore, narrowband channels as such are not provided for in the channelization plan attached hereto, and the Joint Commenters

recommend that the 3.7-4.2 GHz band be rechannelized into 20 and 40 MHz channels."

ANS Comment: ANS does not concur. While ANS has no objection to the use of wide band channels, we observe that the purpose of this rulemaking is to facilitate the use of the bands by the low density 2 GHz users. The above proposal offers no help to these users. If the commenters wish to propose 40 MHz channels, a Petition for Rule Making would be appropriate.

(9/2, 10/1) "While 40 MHz channels should be maintained in the 10.7-11.7 GHz band to accommodate high capacity users, the rest of that band should be rechannelized to provide a range of wideband and narrowband channels. Such a plan will promote spectrum efficiency while serving the diverse needs of the users who will be migrating to this band. While the proposal in the Notice would adopt only 10 and 30 MHz channels, the channelization plan proposed herein will permit users with diverse needs to use 11 GHz frequencies. This plan will also have the added benefit of reducing congestion in the 6 GHz band, the only other low frequency allocation with 10 MHz bandwidth channels."

ANS Comment: ANS opposes this approach. See Attachment A, Modified Plan at Section 3.5.

(10/2) "If the proposed channelization plans are revised in the manner suggested by Joint Commenters, channels of all bandwidths should be available and the industry will be able to avoid the arbitrary channel concatenations that are prevalent today."

ANS Comment: ANS disagrees. See Attachment A, Modified Plan at Section 3.5.

(10/3, 11/1) "... the use of non-standard bandwidth channels, either channel concatenations or splinter channels, should be allowed only upon an appropriate showing that the authorization of such a channel is necessary and would not preclude the future authorization of standard bandwidth channels in the area of proposed operation."

ANS Comment: ANS concurs.

(11/2) "With demand for point-to-point frequencies above 2 GHz expected to increase dramatically, spectrum in those bands will be more valuable than ever. Therefore, it is essential that large chunks of that spectrum not be doled out routinely and that the Commission ensure that, when spectrum is assigned in relative large portions, it is used efficiently and not warehoused, otherwise, an unnecessary shortage of such channels could result. Therefore, the Joint Commenters propose that the Commission adopt the following requirements

designed to ensure efficient utilization of wideband channels and to prevent spectrum warehousing."

(11/3, 12/1) "First, applicants for wideband channels (15 MHz and greater) should be required to submit more extensive justification than other applicants. For example, wideband applicants should be required to demonstrate that their stated communications requirements cannot be satisfied with a narrower channel. They should also be required to show that they will be able to satisfy the channel loading requirements for wideband channels. Moreover, Part 94 applicants who plan to resell excess capacity should be required to submit contracts with their applications evidencing concrete demand for such capacity."

(12/2) "Second, more stringent channel loading requirements must be adopted for wideband assignments. Wideband applicants should be required to demonstrate a need for initial channel loading of at least 50 percent of capacity (e.g., that more than one DS3 circuit has been deployed in a 30 MHz channel). The Joint Commenters also recommend that the Commission authorize independent auditors to examine loading of existing systems. Such auditors would be employed and paid by new applicants seeking frequencies in congested areas. If the auditor discovers that an existing licensee has failed to maintain the required loading, upon Commission confirmation of such a finding, the license should be automatically canceled or the operation should be converted to an appropriate narrowband channel."

ANS Comment: ANS does not understand the need for this additional government regulation. The industry has progressed well for decades without the need for these rules. The Joint Commenters fail to demonstrate that this oversight is needed and shy it is the only appropriate option for large bandwidth channels. ANS notes that the Joint Commenters propose to restrict the use of wide band transmission equipment typically provided by their competitors (Northern Telecom and Alcatel Network Systems). Could it be that the Commenters wish to restrict the sales of equipment provided by their competition? If these rules are necessary, the restrictions should apply to all bandwidth channels. ANS does not believe these restrictions are required at all. However, the users, not the manufacturers, are in a better position to comment on the need for this regulation.

(13/1) "... the Commission should modify Parts 21 and 94 so that identical interference standards and coordination procedures apply to both private and common carriers microwave systems sharing the 4, 6, 10 and 11 GHz bands."

ANS Comment: ANS concurs. As noted previously, the industry is headed in this direction.

(13/2, 14/1) "There is no longer any significant justification for having different interference protection standards for private and common carriers sharing the 4, 6, 10 and 11 GHz bands on a co-primary basis. The equipment used by both private and common carriers will be increasingly identical. There is no logical reason why

operations in the same bands with substantially the same equipment should not be accorded the same protection from interference. Indeed, the Commission has recognized that as a practical matter the interference standards for private and common carriers are rapidly converging. Notice at para. 30. Furthermore, as a result recent changes, both private and common carrier fixed microwave applications are now processed by the same staff in Gettysburg. The Joint Commenters, therefore, recommend that the interference standards prescribed in Part 94 should be incorporated into Part 21, and should be applied to all users of the 4, 6, 10 and 11 GHz bands being reallocated for co-primary use by common carrier and private users. Existing Part 94 standards have been proven to provide sufficient protection and are administered by a recognized standards body, TIA TR14.11."

ANS Comment: ANS notes that the industry is moving toward common coordination criteria. ANS expects that in the near future coordination procedures for both Part 21 and Part 94 will converge. Until that happens, however, ANS believes that the coordination procedure distinctions should remain.

(14/2) "In paragraph 30 of the Notice, the Commission proposes to maintain separate coordination procedures for private and common carrier applications. However, the Joint Commenters believe that many of the reasons that require uniform interference protection standards also require that there should be identical coordination procedures for both private and common carrier microwave systems."

ANS Comment: See above comment.

(14/3) "The Joint Commenters urge the Commission to adopt the prior coordination notice procedures provided for in Section 21.100(d) into Part 94, and to use these procedures for both private and common carrier users in the shared 4, 6, 10 and 11 GHz bands. First, the coordination notice procedure assures that users potentially affected by a proposal will be alerted to the possible new interference. They will be contacted directly, rather than having to review the Commission's weekly public notices. Second, if disputes arise regarding possible interference, they can be resolved by dialogue, rather than having to file petitions to deny applications, triggering time-consuming Commission processes."

ANS Comment: ANS concurs.

(14/4, 15/1) "In paragraph 30 of the Notice, the Commission seeks comments on formalizing the common practice of "reserving" channels in frequency coordination data bases for future growth. The Joint Commenters recognize that providing for the foreseeable growth of existing microwave systems is an important part of an orderly and efficient licensing system. Unfortunately, the "reservation" of growth channels on coordinators' data bases can be used to block expansion of other systems rather than to protect growth. This practice is clearly contrary to wise spectrum management, and accordingly, the Joint Commenters urge the

Commission not to "formalize" any such procedure. Spectrum should continue to be licensed on a first-come, first-served basis without regard to its unlicensed "reserved" status on a frequency coordinator's data base."

(16/3, 17/1) "Thus, while the coordination process serves many useful purposes and should be retained, the Commission should not promote the wasteful use of spectrum by formalizing the reservation of growth channels."

ANS Comment: These are tough issues. The comments of the various users should be used to determine the appropriate approach.

(17/2) "... the Joint Commenters agree that minimum digital modulation requirements should be altered to reflect this need for greater efficiency. Notice at para. 31. Nevertheless, the Joint Commenters believe that in making the transition from 2 GHz to higher frequencies, the needs of users and equipment manufacturers would be best served by a phased approach to implementing new spectral efficiency limits for digital equipment. Under this approach, existing bit-efficiency requirements would apply until the expiration of a five-year period."

ANS Comment: ANS concurs with the concept of transition period. Transition period should be defined. The time period should be two years as it was in 1974 for Para. 21.122.

(18/1) "... an immediate shift to higher efficiency requirements would substantially favor the one manufacturer that suggested the requirements, and would significantly reduce competition in the provision of microwave equipment, a result that would be harmful to users as well."

ANS Comment: The Joint Commenters' statement is not true. ANS challenges the Joint Commenters to prove this outrageous claim. As noted in Attachment A, the FCC proposal does not favor any one manufacturer. ANS concurs with the concept of transition period. The exact time period should be based on industry comments.

(20/2) "The Joint Commenters are pleased that the Commission has recognized the role that automatic transmitter power control ("ATPC") can play in maximizing efficient utilization of the microwave radio spectrum. However, while the rule revisions proposed in the Notice (para. 33) will clarify that ATPC is permitted under both Parts 21 and 94, as described below, the 3 dB power increases allowed under the proposal unnecessarily and substantially limit the benefits that can and should be obtained from ATPC."

(21/2) "... ATPC makes successful microwave operations possible at power levels as much as 10 dB below the maximum for the transmitter involved."

(22/2) "Microwave systems using digital equipment with ATPC would normally be coordinated for and would be authorized to operate at the "nominal" rather than the "maximum" power of the transmitter."

(22/3) "The Joint Commenters recommend that the rules should be modified to provide for up to 10 dB ATPC power increases. 10 dB ATPC power increases would allow systems to operate at significantly lower nominal power levels than those limited to 3 dB increases. This would substantially increase the number of systems that could be authorized in a particular area by allowing them to be placed closer together and to re-use frequencies ore often. Such methods will be necessary to coordinate and operate systems in a microwave environment that will be increasingly more crowded as a result of reallocation of the 2 GHz bands."

ANS Comment: ANS supports changes to facilitate the use of ATPC.

(23/2) "The Commission Should Speed Up Negotiations with NTIA Concerning Access to the 1.70-1.85 and 3.6-3.7 GHz Bands by Non-Governments Users."

ANS Comment: ANS concurs and would encourage the negotiation to include all appropriate government bands below 10 GHz.

Lower Colorado River Authority

(2/4, 3/1) "... LCRA is in agreement with purpose and intent behind the Commission's reallocation and rechannelization plan as proposed in the Further Notice, and urges the Commission to ensure that alternative frequencies will be available to 2 GHz licensees that are suitable for providing equivalent service with comparable reliability."

ANS Comment: ANS concurs.

MCI Telecommunications Corporation

(2/2) "The antenna standards proposed in the Further Notice (revised §21.108 and §94.75) do not represent an improvement over the current obsolete standards."

ANS Comment: Suggestions would be appreciated.

(2/3) "Revision of the Standard A minimums is already long overdue, but the substantial increase in spectrum congestion resulting from this proceeding makes prompt action on this issue all the more important."

ANS Comment: ANS concurs.

(2/4, 3/1) "In response to the original Notice of Proposed Rule Making in this proceeding, MCI commented that efficient spectrum utilization will only be possible if sharing is limited to compatible bandwidths."

ANS Comment: ANS concurs in principle.

(3/2) "MCI recommends the adoption of an alternative channelization approach."

(4/4, 5/1) "The alternative channelization plan recommended by MCI would provide fewer frequency alternatives for the narrow-bandwidth channels. ... These extensive allocations will only serve to disrupt wide-bandwidth system growth."

ANS Comment: ANS does not concur. The object of the proposed rule making is to facilitate the movement of low density 2 GHz users to the higher frequency bands. MCI's proposed frequency plan is a step backwards from the intent of the proposal because it reduces rather than increases the number of needed narrowband channels.

(5/2) "Frequency sharing between analog and digital systems should be avoided. The interference potential between these signal types is much greater than between like systems. Consideration should be given to channelizing this band with some interstitial spacings for analog systems and some fully overlapping spacings for digital systems."

ANS Comment: Although strictly speaking, this statement regarding interference is true for interference into analog systems, the interference is easily overcome with typical engineering practices. See the companion technical paper "Technical Considerations for Digital Expansion of Analog FM 2400 Channel Multiline 6 GHz Microwave Systems." MCI's statement is not true for interference into digital systems.

(6/2) "The issues of grandfathering of existing systems, protection of future growth frequency plans, and use of automatic transmitter power control (ATPC) are well covered in the NSMA comments. MCI fully supports these views and will not reiterate them here."

ANS Comment: Noted.

Motorola

(1/1) "Motorola strongly supports the thrust of this action and urges a swift resolution to the pending issues in order to facilitate the timely introduction of personal communications services ("PCS") and other emerging technologies in the 2 GHz band."

ANS Comment: ANS concurs.

(5/3) "Motorola's prime concern in this matter is the speedy adoption of rules in this proceeding that expedite the reaccommodation of existing 2 GHz microwave users. Therefore, Motorola recommends that the Commission not allow any ultimate changes in the specific channeling plan to delay the sound approach set forth in the *Further Notice*."

ANS Comment: ANS concurs.

(6/3) "... Motorola urges the Commission to explore rule changes that facilitate rapid relocation and construction of 2 GHz microwave links."

ANS Comment: ANS concurs.

(7/1) "In the private land mobile services, applicants for certain land mobile stations are permitted to begin construction and commence operation immediately upon the filing of the appropriate FCC application form where the proposed operation has been successfully coordinated by the Commission's recognized frequency coordinators. This policy reflects the FCC's belief that there is little likelihood of harmful interference from the operation of a properly coordinated application and that the public interest is served by the immediate operation of the proposed station. Motorola urges the Commission to consider whether similar policies are appropriate for microwave operations, at least in the context of accommodating relocated 2 GHz users."

ANS Comment: ANS concurs.

(7/2, 8/1) "Motorola notes that the FCC has previously received two separate petitions for rule making that address the ability of an applicant for a fixed microwave station to preconstruct and operate its applied-for station prior to the issuance of the license. Motorola urges the Commission to reassess the feasibility of implementing some method of instant or temporary licensing which could help reduce the cycle time in making 2 GHz spectrum available for emerging technology services. When viewed in the light of expediting the implementation of emerging technologies such as PCS, the public interest of such an approach may far outweigh any potential minimal problems with ensuring the integrity of the microwave licensing process."

ANS Comment: ANS concurs. This novel idea has considerable merit

(9/2) "Motorola urges the Commission to announce a liberal waiver policy applicable to the frequency bands under consideration in the instant Further Notice. The Commission could apply this policy for all existing licensees in the

1850-2200 MHz band who demonstrate that the existing 2 GHz facilities would be decommissioned upon authorization and construction of the proposed facility in any of the bands that are the subject of this rule making proposal. The waiver policy should extend to technical standards that otherwise would discourage the use of the alternative frequency bands, as well as to eligibility requirements."

ANS Comment: ANS concurs.

(9/3) "Motorola supports the Commission's tentative decision not to delay moving forward on these proposals while it continues to negotiate non-government access to the 1710-1850 MHz band."

ANS Comment: ANS concurs.

MRC Telecommunications, Inc.

(2/2) "MRC presently operates in many areas where there is severe frequency congestion in the 6 and 11 GHz bands, and no acceptable alternative frequencies are available. In other instances, MRC's services are critically necessary to meet the communications needs of users in remote areas. The Commission's proposals in the FNPRM would threaten MRC's ability to meet customer needs for service in both densely populated and remote areas."

ANS Comment: ANS concurs regarding the severe frequency congestion in the 6 GHz bands. The significance of the negative impact of the Commission's proposals is not stated and thus is unclear.

(3/3, 4/1) "MRC and many other similarly situated common carriers currently have in service extensive analog transmission facilities and future plans call for their expansion. The 30 MHz channel separation proposed in the FNPRM seems to consider only digital transmission systems which are less affected by this type of interference. Although the 30 MHz spectrum allocation may be mathematically convenient for its division into smaller increments, it does not address all potential interference sources. Also, even if users operating in the present "T-plan" are grandfathered, new users employing a 30 MHz staggered plan will significantly change the interference environment, creating incompatibility between new and existing 6 GHz operators and an inefficient utilization of the frequency spectrum."

ANS Comment: The proposed lower 6 GHz plan has been revised to eliminate this concern. See Attachment A, Modified Plan at Section 3.2.

(4/2) "The proposed channelization plan for the 4, 6 and 11 GHz bands would permit multiple channel bandwidths within the same frequency spectrum. Significant interference would exist between users utilizing the different bandwidths, such that a user utilizing only a small portion of the spectrum (400 kHz

or 10 MHz) would have the potential of causing unacceptable interference to those carriers needing larger capacities of the spectrum. Thus, a user providing for only its own internal communications needs, or for a few customers, could effectively block a common carrier's ability to serve a wide segment of the public. Therefore, the spectrum efficiency would be vastly decreased and services to the public would be severely impacted."

ANS Comment: Some blocking of high density channels by low density channels is unavoidable when the low density users are brought into the upper frequency bands. The proposed plans were designed to minimize the negative impact.

(4/3, 5/1) "Part 21 of the Rules currently requires 40 MHz spacing for channels in the 11 GHz band. Most existing digital and analog common carrier radio systems in this band are designed for this bandwidth. The rechannelization of the 11 GHz frequency spectrum to 30 MHz and smaller increments would be incompatible with most existing equipment. All existing equipment would have to be removed from service and be replaced or reconditioned to be compatible with the new requirements. This would cause severe disruptions in service to the public and require small carriers such as MRC to incur significant expense, most likely resulting in the cessation of service and business failures."

ANS Comment: This is not true. We are not aware of ANY current radio product in North America (except the new Northern Telecom 6 DS-3 512 QAM product) that uses 40 MHz. ALL current FCC licensed 11 GHz radios use no more than 30 MHz transmission bandwidth. The 40 MHz channels have been a waste of valuable spectrum for many years.

(5/2) "At the very least, before proceeding further, the Commission should consider the problems touched upon herein by examining existing frequency usage in the relevant bands in specific parts of the country. For example, in the greater Chicago, Illinois, area would it be possible to accommodate in the 4, 6 and 11 GHz bands those 2 GHz users which will be displaced?"

ANS Comment: The Commission already has attempted this with Chapter 4 of the December 1991 OET/TS 91-1 study, "Creating New Technology Bands for Emerging Telecommunications Technology."

National Association of Broadcasters

(3/3, 4/1) "... NAB respectfully requests that the Commission maintain its current exclusion of the 1.99-2.11 GHz spectrum from those frequencies to be redeveloped for new telecommunications technologies."

ANS Comment: Noted.

National Public Radio, Inc.

(3/1) "... public radio has successfully coexisted with terrestrial microwave users utilizing 20 MHz channel spacing for more than thirteen years. ... NPR strongly opposes those provisions concerning the rechannelization of the 3.7 to 4.2 GHz band for terrestrial users."

ANS Comment: ANS does not concur. These concerns have been redressed. See Attachment A, Modified Plan at Section 3.1.

(5/2) "The proposal to introduce channel spacings of 400 kHz, 800 kHz, 1.6 MHz, and 5 MHz between 3700 and 3740 MHz as well as between 4160 and 4200 MHz would render four satellite transponders operating in those frequency bands either totally or partially unusable for SCPC and most other satellite applications as well."

ANS Comment: This interference is greatly overstated. We suggest that various accepted methods, such as those outlined in the companion articles "External Interference Noise" and "Technical Considerations for Digital Expansion of Analog FM 2400 Channel Multiline 6 GHz Microwave Systems," be consulted. Example calculations are given for high capacity analog telephony systems (considerably more susceptible to interference than video systems). Note the graceful noise degradation with interfering signal frequency offset.

(6/3) "With a greater number of terrestrial users eligible to use this band on a co-primary basis, and a greater number of channels available for licensing by those users, the likelihood of a new satellite user being able to successfully frequency-coordinate a site is diminished."

ANS Comment: True, but that same situation currently applies to fixed point to point microwave users blocked by the satellite systems.

National Spectrum Managers Association

(2/1) "NSMA believes that careful development of microwave channel plans that will facilitate efficient spectrum utilization is important; appropriate channelization will enable optimal use of spectrum by a combination of wideband and narrowband systems. Any change in existing channel plans, which have influenced the evolution of the electromagnetic environment for many years, will create an increased potential for interference and complicate the frequency coordination process. This is particularly true in urban areas where substantial scattering from structures will increase the likelihood of interference if there is an overlap of channels caused by multiple frequency plans."

ANS Comment: That concern has been eliminated by the proposed revised frequency plans set forth in Attachment A, Modified Plan at Section 3-6..

(2/2) "In order to supplement those narrowband channels already available to accommodate systems displaced from the 2 GHz band, there may be segments of the 4, 6 and 11 GHz common carrier microwave bands which are suitable for narrowband channelization. While the material below addresses possible accommodation of displaced 2 GHz users in the common carrier bands channelized for wideband use, the goal of efficient spectrum utilization would be served if the Commission were to establish rules that would encourage those seeking narrowband channels to look for available frequencies in those bands (e.g., 6, 10, and 18 GHz) which already have narrowband channelization plans that may better match their bandwidth needs. In those instances where the Commission determines that it is appropriate to establish narrowband plans for frequencies currently used by wideband systems, the rules should specify a plan which will ensure that as few wideband channels as possible are consumed supporting narrowband systems. This will result in the minimum impact on current and future wideband users. It is also important to note that the 1850-1990 MHz private band, currently of primary interest for potentially producing displaced incumbents, is channelized to accommodate only six 10 MHz channel pairs and five 5 MHz channel pairs. A study by Comsearch of the Houston area indicated that nearly all 1850-1990 MHz incumbents in that vicinity could be re-accommodated in the upper 6 GHz band (6.525-6.875 GHz) without accounting for the possibility that some of those displaced might be served by media other than fixed microwave. It seems likely that extensive use of wideband systems by displaced 2 GHz narrowband users may be unnecessary."

ANS Comment: Noted. Again, however, not all 2 GHz users could be re-accomodated at 6 GHz. Also, this re-accomodation would eliminate growth at 6 GHz due to the full utilization of the band.

(2/3, 3/1) "The new channelization plans in the FNPRM might be appropriate if newly available frequency spectrum were being initially channelized. However, the 4, 6, and 11 GHz common carrier bands are already well developed and industry-standard channelization plans are closely followed. Should the new plans be adopted, all of the existing installations and their future growth would need to be grandfathered in order to avoid disruption of existing licensee operations. This base of facilities will be far greater than the future development in some of these bands, so adopting new channelization plans rather than endorsing the existing industry-standard plans makes little sense. In addition, the coexistence of incompatible plans would increase interference opportunities among systems and decrease efficient use of the spectrum. NSMA recommends that the current industry-standard wideband channel plans be used as the foundation for any new narrowband channelization plans adopted by the Commission."

ANS Comment: The revised frequency plans set forth in Attachment A, Modified Plan at Section 3-6, address these issues.

(3/2) "Specifically, adoption of the proposed Alcatel channel plans into the proposed rules would raise obvious concerns with spectral inefficiency. With a mix of narrow and wide band carrier frequencies utilizing the same spectrum, inefficiency becomes unavoidable and steps would have to be taken to minimize spectral waste. For example, in a highly RF congested locality an occasional 29.65 MHz T-Plan frequency pair may be available for a new installation using the common carrier 6 GHz band. If a narrow band signal (5 MHz bandwidth) is licensed in the same segment of spectrum as a 29.65 MHz carrier, then nearly 25 MHz of spectrum could remain fallow."

ANS Comment: The hypothetical problem stated is possible. As noted previously, moving low capacity users into high density frequency bands is a compromise for both. It is important that organizations such as NSMA develop administrative procedures to group as many low density users into the same high capacity channel as necessary to minimize fallow spectrum.

(3/3) "To minimize this potential in the 6 GHz and 11 GHz common carrier bands, signals that occupy less bandwidth than the presently operating channel plans should be accommodated, where possible, by the "guard bands" at the upper and lower ends of the bands and in the center segments not used for wideband transmission."

ANS Comment: This option was considered. However, it did not provide for many low density channels. Several low density channels are necessary to comply with the Commission's directive to modify the higher frequency band technical rules to facilitate the movement of the 2 GHz users.

(3/4) "Where the guard band/band center spectrum is not available or technically feasible to use, a showing could be supplied with the application indicating why this spectrum is unsuitable. In some cases, use of a portion of a wideband channel may be justified, however, care must be taken that the applicant is authorized use of a wideband channel pair as close to the band edges as is practical. In any case, allocation of narrowband channels overlaid on existing wideband channels should occur only on a very limited basis."

ANS Comment: This is a reasonable administrative policy.

(3/5) "The 4 GHz band is currently used with interleaved transmit and receive channels. The new channelization proposes change to a "high/low" configuration; this will increase the difficulty of frequency coordination by causing interference conflicts with both ends of an old path and potentially eliminating the availability of cross-polarization isolation between frequency pairs. Little new 4 GHz microwave should be anticipated because of coordination conflicts with the numerous receive only "C" band earth stations that are registered; therefore this band is likely to be of little use to narrowband users even if a channel plan to accommodate this use is adopted."

ANS Comment: ANS concurs on both points. The technical concerns have been addressed by the revised frequency plans set forth in Attachment A, Modified Plan at Section 3.1.

(4/1) "The 6 GHz band, which uses several frequency plans, should retain the current 29.65 MHz channel bandwidth. Revisions of the channel plans so that new assignments will fall on integer values will create an offset with incumbent users of between .2 and 2.2 MHz, increasing the interference levels, particularly between digital paths. In addition, cross-polarization isolation may be lost."

ANS Comment: These concerns are overstated. The companion articles, "External Interference Noise" and "Technical Considerations for Digital Expansion of Analog FM 2400 Channel Multiline 6 GHz Microwave Systems," should be consulted. The interference due to 2.2 MHz overlap out of 30 MHz is nominal. Nevertheess, ANS has revised the proposed frequency plans to use traditional 29.65 MHz spacing. See Attachment A, Modified Plan at Section 3.2.

(4/2) "In addition to requiring grandfathering of existing paths and their growth plans on all common carrier wideband frequencies, carriers will need to be able to reuse decommissioned equipment on new paths. They may also extend systems with new paths that must match the existing frequency plan in order to avoid intrasystem interference at the junction stations."

ANS Comment: These concerns have been dealt with by the revised frequency plans. See Attachment A, Modified Plan at Section 3.2.

(4/3) "Grandfathering is mentioned throughout the body of the FNPRM, but there is no inclusion of grandfathering in the actual rule sections; this appears to be inappropriate. Without the "protection" of grandfathering provisions in the Rules, it will not be possible for a licensee to know what options are available."

ANS Comment: ANS concurs.

(5/2) "Common carriers have historically secured future growth channels through the prior coordination process. This process has proven invaluable for establishing long range growth plans, particularly in frequency congested areas. If this capability is to be extended to the 6 GHz private microwave band, which will now be shared with common carriers, Part 21 frequency coordination procedures must be adopted in this band."

ANS Comment: Noted.